of Dorn et al. functions by refracting incident light at one or more angles by varying the refractive index of the polymer material (following Bragg's Law) through variation of the electric fields generated by the electrodes. There is no switching functionality without the ability to modulate the diffraction pattern via the electrostatic grating. The function of the optical switch is to diffract incident light away from the switch at various angles such that the light may be received by a different optical device, such as a detector.

The fundamental difference of a waveguide, with respect to an optical switch, is that a waveguide confines the incident light to the waveguide to as great an extent as possible along an optically transmissive path. A waveguide is formed when a media is surrounded by another media of lower refractive index. The waveguide in the present application does not diffract light away from itself as would the optical switch of the type described by Dorn et al.; instead, the refractive indices of the differing polymer materials confine the incident light by constantly refracting light toward the central axis of a propagation path. Dorn et al. do not teach an optical waveguide comprising an optically transmissive material surrounded by another material of a (necessarily) lower refractive index. Furthermore, those skilled in the art realize that a true optical waveguide comprises "a medium in which the propagation of an optical wave is confined in one or two-dimensions, the confinement dimension being comparable to the wavelength of light." ("Introduction to Nonlinear Optical Effects in Molecules and Polymers", Paras N. Prasad and David J. Williams, John Wiley & Sons, Inc., publishers, p. 252, 1991) Clearly, the plane defined by any of the polymer films taught by Dorn et al. are not of the spatial order of the wavelength of incident light.

Referring to page 2 of the 01/11/2006 office action, the Examiner quotes the following definition of 'waveguide': "A system of material boundaries ... capable of guiding high-frequency electromagnetic waves." Applicants wish to draw attention to the fact that the *full* definition of 'waveguide' (taken from the same reference) is "A system of material boundaries in the form of a solid dielectric rod or dielectric-filled tubular conductor capable of guiding high-frequency electromagnetic waves." The underlined was excluded from the definition that the Examiner relied upon when responding to Applicants' argument that the device taught by Dorn et al. functions as a Bragg mirror and does not "guide" incident light, as light would be guided in a true optical waveguide. The concept of a rod or tubular conductor implies that the nonlinear

optical material comprising the waveguide has a length associated with the propagation direction of the incident light, that is greater than either of two planar axes that define the surface of the optical material where light enters the device (e.g., a fiber-optic). This is a critical distinction between a planar optical switch of the type taught by Dorn et al. and the Applicants' waveguide. Even considering the 'depth' of the material boundaries provided multiple polymer layers taught by Dorn et al., the purpose of these layers is to form the basis of an <u>overall</u> refractive index comprising the <u>sum</u> of the layers. Incident light refracts from the optical switch according to the overall refractive index of the sum of the polymer layers. Dorn et al. clearly do not teach a rod- or tubular-like waveguide.

Finally, Dorn et al. teach an optical switch that functions only by presence, absence, or variation of "a three dimensional diffraction pattern ... extending in the form of a first layer above the substrate." The functionality of the present invention does not rely on a three dimensional diffraction pattern, nor does it comprise a diffraction pattern in the form of a first layer above the substrate.

The above explanations clearly distinguish between an optical switch and an optical waveguide, and further differentiate the unique optical functionality of each respective device. Dorn et al. describe an optical switch. Applicants claim an optical waveguide, and therefore Dorn et al. do not anticipate Applicants' claims. Applicants therefore request allowance of independent claims 1, 2 and 16.

Claim rejections – 35 U.S.C. §103(a).

The differences between the optical switch of Dorn et al. and the Applicants' waveguide precludes obviousness. The reference to Oh et al. does not teach any material that would substantiate obviousness in the pending application in light of the differences between the two optical devices discussed above. Applicants request that the Examiner remove the obviousness rejection of dependent claims 3-15 and 17-27, which each depend either directly or indirectly from claim 1.

Conclusion

Applicants submit that the claims 1-27 are in condition for allowance, and request favorable consideration of these claims. It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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